

# HJ Lubtronic

Advanced Lubricator for Increased Flexibility and Security

- Delivery of fresh oil in every engine revolution
- Optimised cylinder oil consumption
- Improved cylinder condition during slow steaming
- Feed rate adjustment by variable stroke length
- Load dependent
- Easy operation for crew
- Timing adjustment
- 100% redundancy (both in the electronic and the mechanical part)

# HJ Lubtronic

## Purpose



Hans Jensen Lubricators A/S has developed an electronically controlled (hydraulically driven) lubricator, for cylinder lubrication of 2-stroke diesel engines. HJ Lubtronic ensures:

- Optimised feed rate
- Injection with every engine revolution
- Flexible feed rate
- Load regulation (especially for engines without cam shaft)
- Easy operation
- Flexible timing
- Enhanced safety

HJ Lubtronic is equally suitable for both mechanically and electronically controlled engines, and is characterised by:

- Full electronic control with application of MEP, BHP or user defined algorithms
- Logging of data
- Stepless adjustment of stroke length
- Redundancy of key functions on all operation levels
- Injection with every piston stroke
- Can be installed on MHI, Sulzer and MAN engines

HJ Lubtronic operates with a variable stroke length, and supplies fresh lube oil with every engine revolution, which is an important feature in general, but particularly crucial when slow steaming – which is used more and more in shipping today.

## With SIP Lubrication

HJ Lubtronic is fully functional with non-return valves, but we recommend that HJ Lubtronic is used in combination with HJ SIP valves. This is a strong combination, with regards to maximum control of cylinder oil consumption, which can now be automatically regulated according to a predetermined algorithm. It can be regulated from the highest to the lowest injection, from minute to

minute, and thus completely follow the engine's curves, avoiding both under- and over lubrication.

The signals for control of HJ Lubtronic's time of injection and amount can come either from existing signals or from mounted sensors.



# Standard HJ Regulation Algorithms

## Description

Based on index/load pickup on the fuel regulation shaft of the system, and based on choice of regulation type, an automated adjustment of lube oil can be controlled. The index/load pickup unit is calibrated based on data sheets from the individual engine's fuel index curves.

Typically, we use a load dependent regulation (BHP regulation). This regulation type

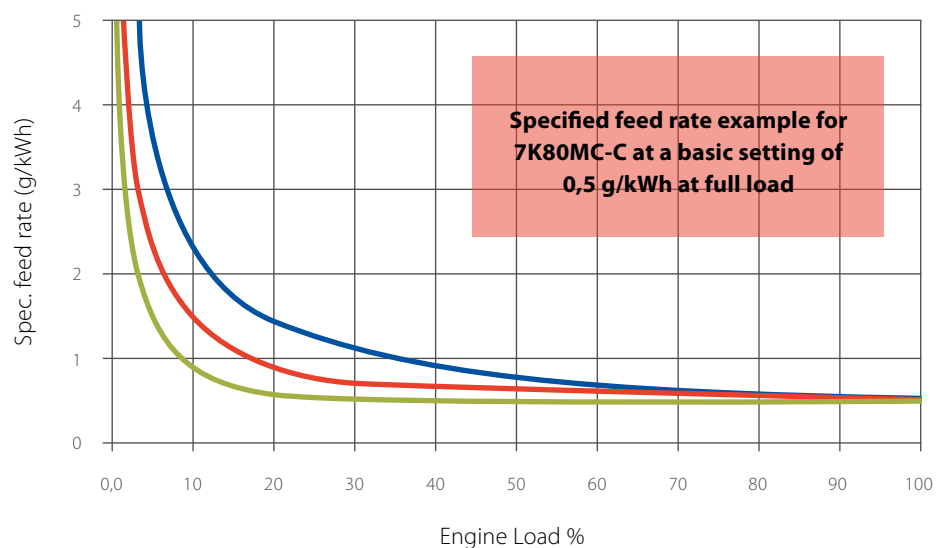
secures that the specific feed rate is constant, i.e. at part load the system reduces the feed rate proportional to the load. In some cases, a more conservative regulation algorithm is chosen (MEP regulation), where the reduction is smaller. The savings in cylinder oil consumption takes place due to the feed rate being kept stable, as opposed to systems without regulation. These types of systems are also shown as RPM regulation.

# User specified HJ Regulation Algorithms

## System Overview

It is possible for the user of the system to determine his/her own algorithms, and it is really only the imagination of the user that sets the limits.

- RPM dependent
- MEP proportional dosing
- BHP proportional dosing



The curves can be adapted to the individual engine.

# HJ Lubtronic

## Description



The complete system consists of a number of HJ Lubtronic lubricators, 1 per cylinder, each connected to a local controller – in an arrangement.

Each of the HJ Lubtronic lubricators (electronically controlled and hydraulically operated), one for each cylinder unit, has its own local controller (CLC) with display, that entirely controls the connected lubricator. The injection timing is calculated in each CLC based on a common signal distributed directly from flywheel pickup to each individual CLC.

The hydraulic pump unit includes a control panel, monitoring and controlling the functions of the redundant hydraulic pump unit (with redundant pump string and filtering equipment). The redundant hydraulic pumps supply system pressure to the individual lubricators. An alarm merger, merging

alarms from all lubricators and connecting the main monitoring system is also included. The control panel is also supplying 24VDC to the entire HJ Lubtronic system.

An RPM pickup delivers the exact information about the crank angle to all lubricator units.

A rack-based computer unit is also included, with central monitoring, logging and operation of the system.

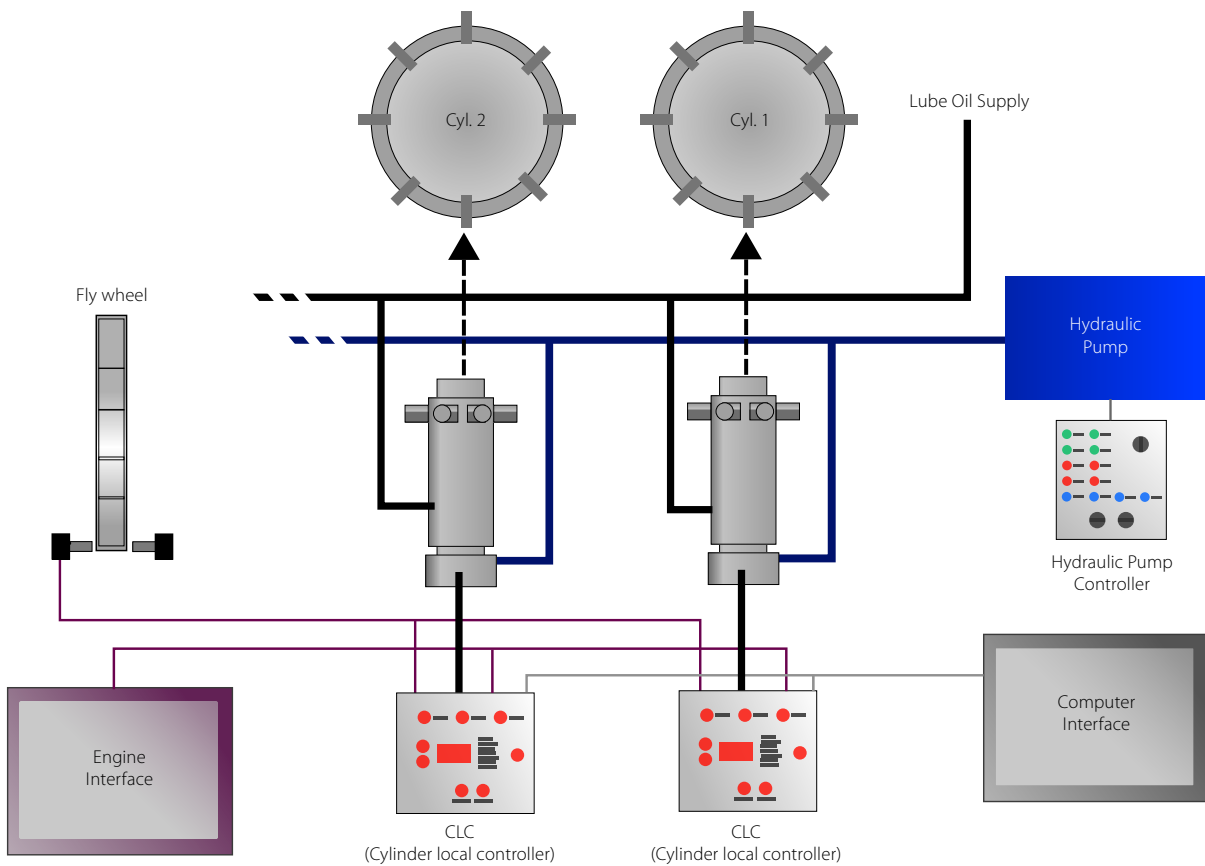
An Index/load pickup connected to the fuel regulation shaft distributes the actual index/load to the other local controllers (via the RS 485 network).

A cylinder oil pump unit is securing the correct pressure and oil temperature to the lubricators, the unit has redundant pumps and filters with auto change-over to standby pump.





## System Overview



# HJ Lubtronic Lubricator

## Description

In the upper part of the lubricator, a DC motor and gear is located, which regulate the height of the stop-bolt. On top of the stop-bolts, a potentiometer is fitted, which measures the position of the stop-bolt and reports back to the DC motor control.

In the upper part of the lubricator, each lube point has a built-in safety valve. In the event of activation of the safety valve, a reed switch triggers an alarm in the control.

In the middle part of the lubricator, the number and size of pistons depend on the actual engine.

The lubricator pistons enable a precise delivery of the amount of oil, which is predetermined by the local controller. The automated quantity adjustment, run by above mentioned DC motor drive, adjusts the position of the stop bolt in the lubricator – hereby limiting the stroke length of the pistons to the amount of cylinder oil, actually determined. The pistons return to bottom position by means of a spring. The lubricators are then ready for the next stroke.

The lower part the lubricator is the driving part, consisting of a redundant solenoid valve and two sets of individual pistons, delivering the necessary force to lift the hydraulic pistons, which are connected to the dosing pistons in the lube oil part by a direct axial connection.

The lower part of the lubricator also contains a sensor, checking that the lubricator's pistons move as intended, and on time.

Moreover, each unit is equipped with isolating valves and an accumulator for safe and precise delivery of hydraulic force.

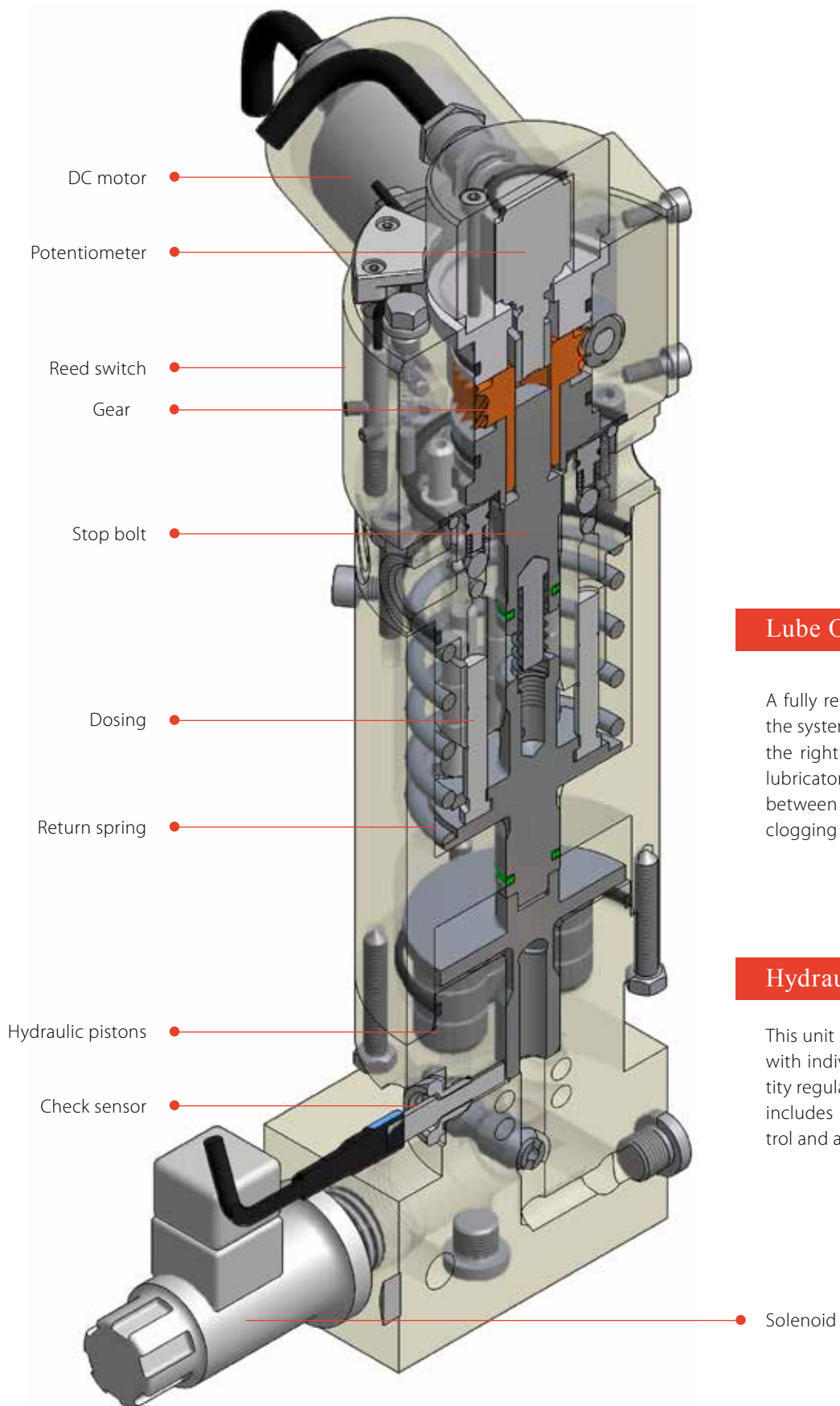
For every HJ Lubtronic lubricator, a local controller (CLC) is mounted, which monitors and regulates all functions for this particular lubricator. Each local controller is connected to two sets of flywheel pickup sensors that enable the synchronization of the engine and the HJ Lubtronic system. Each CLC receives these signals from the engine and calculates injection time based on this. This means, that even though the connection to the central computer is disconnected, timed lubrication is still present.

Information to the lubricator about stroke length regulation comes from the central computer and is transformed to regulation- and control signals in the CLC.

The CLC contains redundant circuits for all functions, and in addition to this there is a display for multifunctional viewing of various parameters, and for regulation of certain parameters, as well as for regulation, alarm reading and reset.

If you want priming before start-up, this is also carried out on this display.





### Lube Oil Supply Unit

A fully redundant pump unit is also part of the system, which ensures supply of oil with the right pressure and temperature to the lubricators. An auto swap feature is present between the two pump units, in case of clogging of a filter.

### Hydraulic Unit

This unit consists of 2 separate pumps/units with individual filter surveillance and quantity regulation. The hydraulic pump unit also includes a control panel, with engine control and alarm handling.



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